Part Marking Master's Perspective

[Machine Readable Identification (MRI) With Automated Data Capture]

-SMART Implementation- Journey to Optimization

Facilitated By:

NDIA Industry Leadership Advisory Group (ILAG)

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Part Marking Master's Input

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Leading The Way To MRI With Automated Data Capture!

Why MRI With Automated Data Capture?
-Success Stories-

- ✓ **100% Reduction – Quality Errors**
- ✓ **100% Reduction - Quality Escapes**
- ✓ **100% Reduction - Quality Notifications**
- ✓ **90% Reduction – Labor (cycle time)**
- ✓ **50% Reduction – Product Development Span Time**

Master's Perspective – SMART Implementation

- ✓ **S**imple Rules
- ✓ **M**anage Implementation
- ✓ **A**dvanced Planning
- ✓ **R**educe Costs
- ✓ **T**ransform!

Master's Perspective – SMART Implementation

- ✓ **Simple Rules**

SIMPLE RULES!

- ✓ **LEAD transformation to MRI with automated data capture**
- ✓ **Identify "your pain" and quantify what transformation will mean to the organization in terms of internal and external benefits**
  - ◇ **Cost, schedule, standardization, confidence and quality improvements, compliancy**
- ✓ **Align transformation journey to customer(s) needs**
  - ◇ **IUID Compliance and Customer timelines used as a trigger (engagement) opportunity**
- ✓ **Estimate the cost of transformation**
  - ◇ **Infrastructure costs for Optimization vs. IUID compliancy**
- ✓ **Obtain and maintain High-level support**
  - ◇ **Commitment to transformation journey, resources and funding**
  - ◇ **Flow-down commitment and expectations to organization and suppliers**

SIMPLE RULES!

- ✓ **Begin transformation journey with pilots**
  - ◇ **Small "bounded" pilots – 1 Product**
  - ◇ **Fully test MRI and automated data capture procedures**
  - ◇ **Fix root problems prior to next roll-out activity**
  - ◇ **Notify and engage suppliers during planning stage**
    - **To begin to transform their processes in order to provide MRI product and data elements as required**
- ✓ **Remain informed**
  - ◇ **Work with technology providers**
  - ◇ **Engage in industry and government working groups**
  - ◇ **Modify transformation journey as technology evolves and as common standards and policy requirements are more universally adopted & applied**

Master's Perspective – SMART Implementation

- ✓ **Simple Rules**
- ✓ **Manage Implementation**

MANAGE IMPLEMENTATION!

- ✓ **Manage implementation like a "Program"**
  - ◇ **Set measurable objectives and goals**
  - ◇ **Form a diverse team – organization, customers, suppliers**
  - ◇ **Plan, estimate, schedule, execute, mitigate**
  - ◇ **Monitor performance and improvement metrics**
- ✓ **Formulate strategy and timelines based on**
  - ◇ **Compliance**
  - ◇ **Internal and external "Pain" (process improvements)**
  - ◇ **Evolutionary approach**
    - • **Pilots**
    - • **Trigger events to reduce cost impacts**
    - • **Supplier input**
  - ◇ **Full optimization and institutionalization**

MANAGE IMPLEMENTATION!

- ✓ **Engage a diverse implementation team**
  - ◇ **Contracting, procurement/supplier management engineering, operations, information systems, sustainment organizations**
  - ◇ **Major Customers, DCMA, suppliers, sub-tiers**
- ✓ **Standardize and disseminate plan elements and expectations**
  - ◇ **Global policy regarding transformation (5-10 year plan)**
  - ◇ **Communication and training plans**
  - ◇ **Performance metrics**
  - ◇ **Harmonize configuration mgmt requirements with marking and data requirements**
  - ◇ **Manage supplier flow-down and costs**
- ✓ **Build energy and excitement regarding transformation**
  - ◇ **Engage**
  - ◇ **Communicate, communicate, communicate!**

Master's Perspective – SMART Implementation

- ✓ **S**imple Rules
- ✓ **M**anage Implementation
- ✓ **A**dvanced Planning

ADVANCED PLANNING!

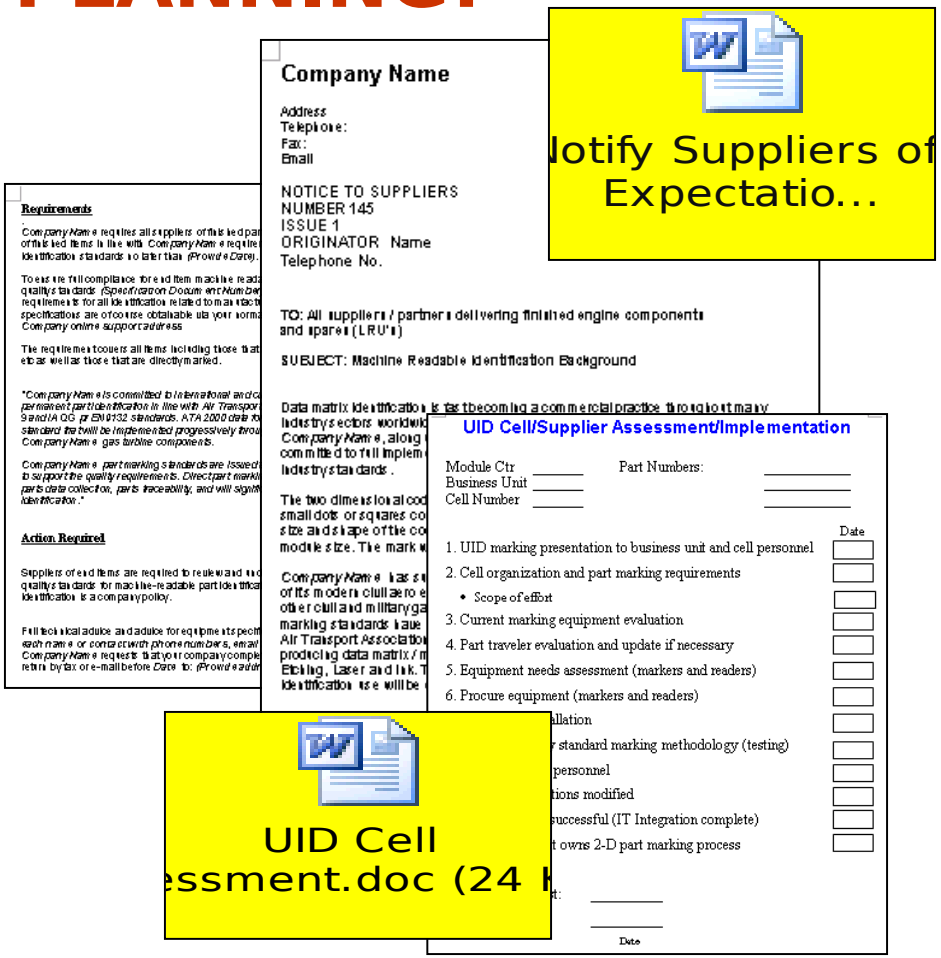
- ✓ Agree to MRI products/items listing
- ✓ Identify current state and capabilities
  - ◇ How items are marked…with what data elements (uses)
  - ◇ Technology utilized and types of equipment
  - ◇ Location of product/item “touch points”
  - ◇ Location of product/item “data capture touch points”
  - ◇ Information Systems potentially affected
    - • Data elements, uses and current integration
  - ◇ WAWF and IUID Registry integration (process flows)
  - ◇ Supporting documentation
- ✓ Agree to data elements listing (integrated with use cases)
  - ◇ Internal value
  - ◇ Customer requirements
  - ◇ External value

ADVANCED PLANNING!

- ✓ **Develop MRI with automated data capture future state processes and implementation activities**
  - ◇ **Standard procedures and work instructions for implementation**
    - **Accessible (electronic)**
  - ◇ **Common marking processes**
    - **Create marking requirements to integrate with current marking capabilities and change engineering specification upfront**
    - **Based on latest MIL-STD 130**
    - **Harmonize DoD and commercial requirements for single marking system**
  - ◇ **Common data elements and information system data flow processes**
    - **Eliminate non-value added "data capture touch points"**
      - **Future state includes only value added "data capture points"**
    - **Define information system integration**
      - **What systems need to be modified**
      - **Automated downloads of data**

ADVANCED PLANNING!

- ✓ **Notify and engage suppliers to begin to transform their processes in order to provide MRI product and data elements as required**
  - ◇ **Disseminate an expectation notice to suppliers**
  - ◇ **Train and assist suppliers in their journey**
- ✓ **Develop supportive and continuing processes**
  - ◇ **Monitoring performance and metrics**
  - ◇ **Training**



Master's Perspective – SMART Implementation

- ✓ **S**imple Rules
- ✓ **M**anage Implementation
- ✓ **A**dvanced Planning
- ✓ **R**educe Costs

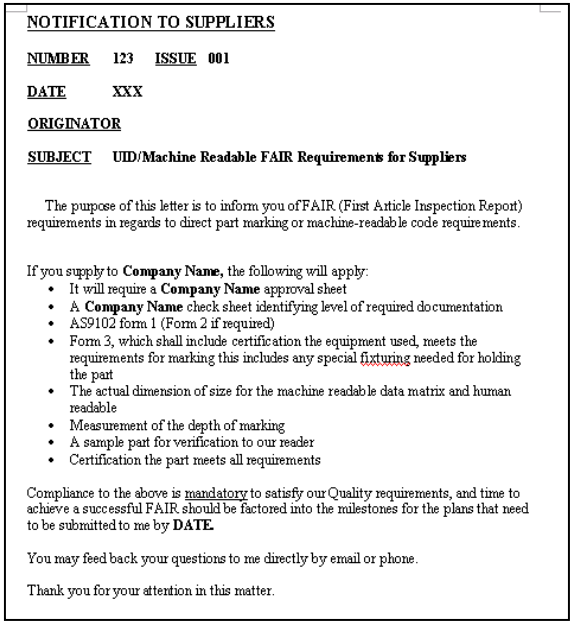
REDUCE COSTS!

- ✓ **Drive automated reading of marks and data transfer to eliminate manual key stroking, manual quality errors and processing time throughout the entire lifecycle!**

- ✓ **Minimize legacy system changes…utilization suggestions**
  - ◇ **Keyboard wedge technology to feed legacy and new systems**
  - ◇ **Automate pull of import text files into legacy and new systems**
  - ◇ **Distribute numerical control system to store saved marking system instructions (patterns)**
- ✓ **Standardize marking formats**
  - ◇ **Suppliers benefit as well**

REDUCE COSTS!

- ✓ **Devise formal, documented training programs**
  - ◇ **Team members, marking and verification equipment operators, data capture operators, suppliers**
  - ◇ **Be creative….accomplish training via internet web meetings**
- ✓ **Provide continuing support to suppliers**
  - ◇ **Standardize information to suppliers**
  - ◇ **Brainstorm with suppliers how to**
    - • **Reduce equipment and marking transformation costs**
    - • **Eliminate errors prior to the "first mark"**
      - – **Offer to review sample marks prior to production and/or require FAIR - First Article inspection Reports**



NOTIFICATION TO SUPPLIERS

NUMBER 123 **ISSUE** 001

DATE XXX

ORIGINATOR

SUBJECT **UID/Machine Readable FAIR Requirements for Suppliers**

The purpose of this letter is to inform you of FAIR (First Article Inspection Report) requirements in regards to direct part marking or machine-readable code requirements.

If you supply to **Company Name,** the following will apply:

- It will require a **Company Name** approval sheet
- A **Company Name** check sheet identifying level of required documentation
- AS9102 form 1 (Form 2 if required)
- Form 3, which shall include certification the equipment used, meets the requirements for marking this includes any special fixturing needed for holding the part
- The actual dimension of size for the machine readable data matrix and human readable
- Measurement of the depth of marking
- A sample part for verification to our reader
- Certification the part meets all requirements

Compliance to the above is mandatory to satisfy our Quality requirements, and time to achieve a successful FAIR should be factored into the milestones for the plans that need to be submitted to me by **DATE.**

You may feed back your questions to me directly by email or phone.

Thank you for your attention in this matter.

Master's Perspective – SMART Implementation

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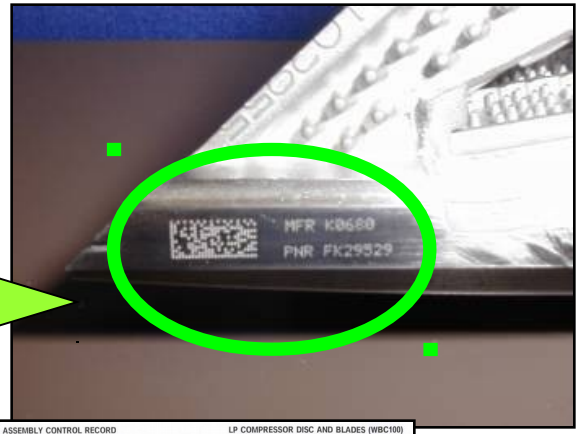
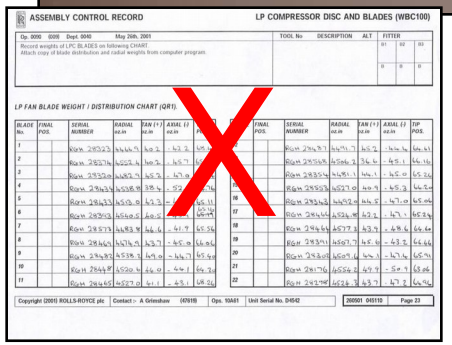
- ✓ **T**ransform!

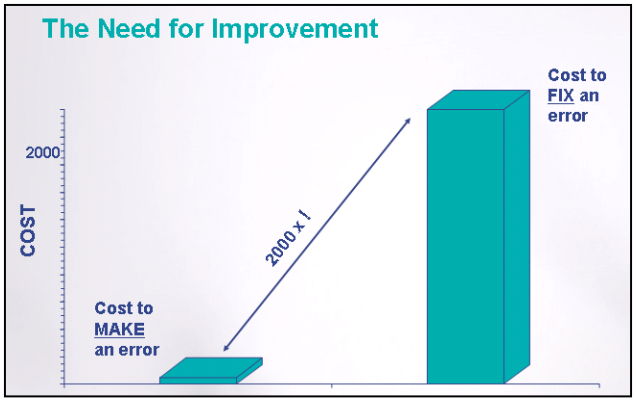
TRANSFORM!
Benefits of MRI and Automated Data Capture

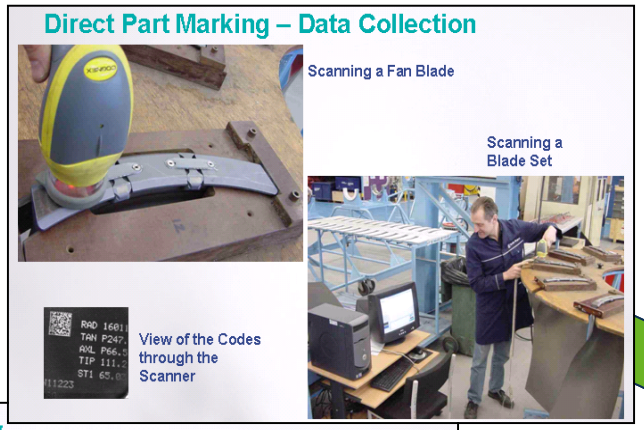
- ✓ **Significantly reduces risk of quality failure associated with identification escapes**
- ✓ **Eliminates legibility issues**
- ✓ **An enabler to a paperless system**
- ✓ **Improves speed and accuracy of data transfer**
- ✓ **No data transcript errors**
- ✓ **Internationally recognized**
- ✓ **Has the ABILITY to……..**
  - ◇ **Improve parts traceability**
  - ◇ **Reduce internal processing procedures**
  - ◇ **Capture accurate 'As Built' data**
  - ◇ **Check 'Should Build' data**
  - ◇ **Reduce Replenishment costs**
  - ◇ **Generate electronic log books**

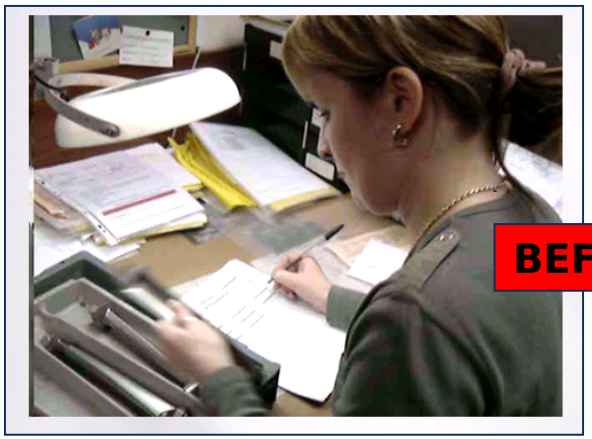




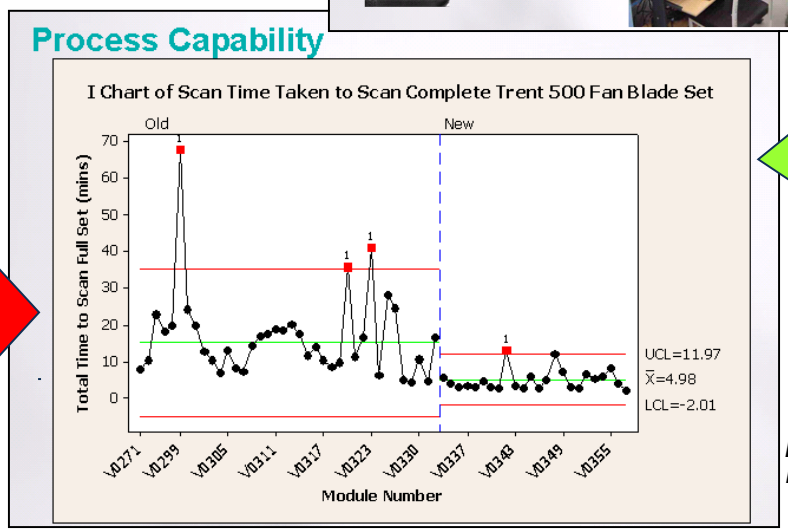
An MRI Journey - Sample







BEFORE



AFTER

Provided Courtesy of Rolls Royce Engines : Nat Russhard Oct 2005

Technical Information
-Lessons Learned-

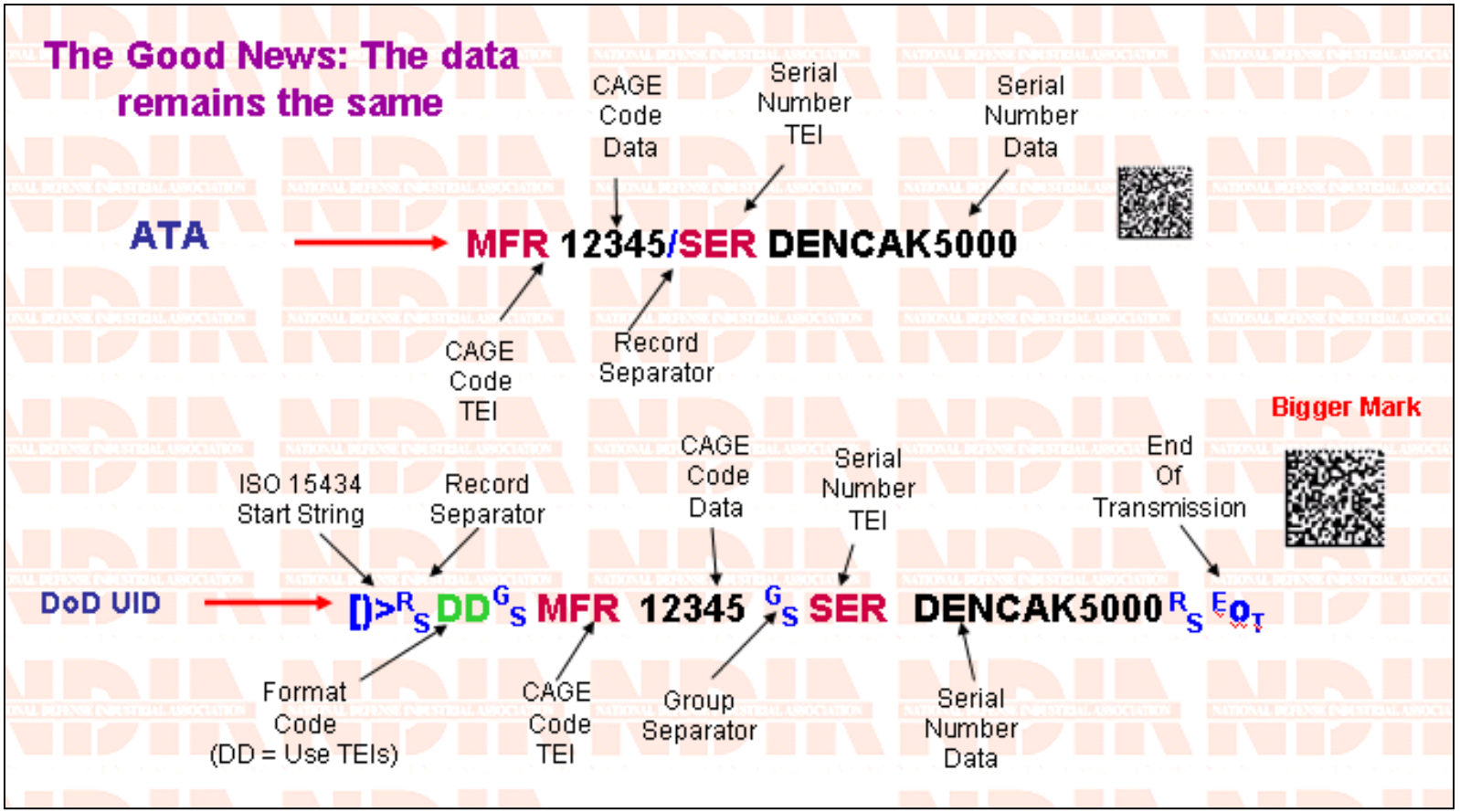
Technical Information

- ✓ **Eliminate UII construction errors which could cause costly labor hours to fix and schedule delays**
  - ◇ **Don't encode the UII data element string without a format code**
  - ◇ **Don't 'hard code' RS, GS, EOT**
    - **Must use their ASCII character representation in the syntax**
  - ◇ **Use the message header, group separators, record separator, and end of transmission in the syntax per ISO 15434**
  - ◇ **Don't use the same enterprise identifier more than once in the message string**
  - ◇ **Use the appropriate data qualifier when encoding a concatenated UII or a DoD recognized IUID equivalent**
  - ◇ **Don't mix the use of Data Identifiers, Application Identifiers or Text Element Identifiers in the message**
- ✓ **Finding a UII construction or syntax error AFTER marking the part is too late!**

Tips!

http://www.acq.osd.mil/dpap/UID/attachments/Tips%20on%20Constructing%20the%20UII.pdf

Technical Information



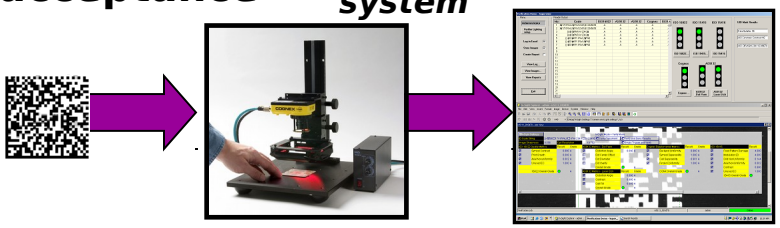
The DoD UID Construct is an accepted equivalent to the ATA Construct.

Technical Information

<u>Verification</u> – Evaluation of the marking quality of the 2D Data Matrix symbol for:

- **Marking quality and part payment acceptance**
- **Marking process setup and control**
- **Prediction of marking durability**
- **Standards are still evolving**
- **Sampling plan**
  - **Defined by internal Mfg process procedures for the verifier**
  - **5% of markings checked but could be larger based on batch size**

ISO Verifier system



<u>Validation</u> – 2D Data Matrix symbol has the appropriate syntax and semantics according to the last version of MIL-STD-130

- **Syntax shall comply with ISO 15434 → Unprintable ASCII characters complicate that**
- **Semantics for AIs or DIs shall comply with ISO 15418**
- **Semantics for TEIs shall comply with ATA Common Support Data Dictionary (CSDD)**

IN SUMMARY…

- ✓ **Simple Rules**
- ✓ **Manage Implementation**
- ✓ **Advanced Planning**
- ✓ **Reduce Costs**
- ✓ **Transform!**

and…continue to share Lessons Learned!